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EXAMINER

ART UNIT	PAPER NUMBER
1112	9

DATE MAILED: 10/03/94

This is a communication from the examiner in charge of your application.
COMMISSIONER OF PATENTS AND TRADEMARKS☒ This application has been examined ☒ Responsive to communication filed on 6/21/94 ☐ This action is made final.A shortened statutory period for response to this action is set to expire 3 month(s), 0 days from the date of this letter.
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133**Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:**

- ☒ Notice of References Cited by Examiner, PTO-892.
- ☒ Notice re Patent Drawing, PTO-948.
- ☒ Notice of Art Cited by Applicant, PTO-1449.
- ☐ Notice of Informal Patent Application, Form-PTO-152.
- ☐ Information on How to Effect Drawing Changes, PTO-1474.
- ☐

Part II SUMMARY OF ACTION

- ☒ Claims 1-16 are pending in the application.

Of the above, claims _____ are withdrawn from consideration.

- ☐ Claims _____ have been cancelled.

- ☐ Claims _____ are allowed.

- ☒ Claims 1-16 are rejected.

- ☐ Claims _____ are objected to.

- ☐ Claims _____ are subject to restriction or election requirement.

- ☒ This application has been filed with informal drawings under 37 C.F.R. 1.85 which are acceptable for examination purposes.

- ☐ Formal drawings are required in response to this Office action.

- ☐ The corrected or substitute drawings have been received on _____. Under 37 C.F.R. 1.84 these drawings are ☐ acceptable. ☐ not acceptable (see explanation or Notice re Patent Drawing, PTO-948).

- ☐ The proposed additional or substitute sheet(s) of drawings, filed on _____, has (have) been ☐ approved by the examiner. ☐ disapproved by the examiner (see explanation).

- ☐ The proposed drawing correction, filed on _____, has been ☐ approved. ☐ disapproved (see explanation).

- ☒ Acknowledgment is made of the claim for priority under U.S.C. 119. The certified copy has ☐ been received ☐ not been received.
☒ been filed in parent application, serial no. 07/891,970; filed on 6/1/92

- ☐ Since this application appears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.

- ☐ Other

EXAMINER'S ACTION

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15) The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The present title includes any subclass that is for lasers, with no distinguishing characteristics.

16) Claims 1-16 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

After the first use of a term or limitation, the articles --the-- or --said-- should be used unless applicants intend to introduce another limitation, which should then be differentiated. Hence "a laser" (claims 1, 6 and 11, line 3), "an object" (claims 1, 6 and 11, line 9) need correcting.

The condensing limitations do not make sense because one forms a beam spot on an object with a laser beam. Applicants are claiming forming a beam on an object with a beam ! It is further noted that all laser beams may be considered to be line-shaped (although the width may vary, as the beam travels from one point to another).

In claim 1 the "changing" limitation also might be more meaningful if it refers to the beam spot being "line-shaped". Also, in claim 16.

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17) Applicants information disclosure is made of record, however, it is noted that only the Yamazaki references appear related to the present claims.

18) The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

19) Claims 1-16 are rejected under 35 U.S.C. § 103 as being unpatentable over Yamazaki et al (358) alone or in view of Yamazaki et al (855) and Toshiba KK or NEC Corp (131) or (123) or Traskos et al or Hongo et al or Krimmel et al.

Yamazaki et al (358) teaches forming a pattern on a coated substrate (ie. treating an object) via irradiation with an excimer laser beam shaped through a mask which removes portions to shape the beam and pattern (abstract). It is disclosed that excimer laser beams generally emit a beam with a rectangular cross-section (col. 2, lines 40-41). The beam is first treated

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by an expander, contracted by a convex cylindrical lense made of artificial quartz and shaped by a mask (Fig. 1 and col. 2, lines 30-45). The mask is used to remove edge portions of the expanded rectangular beam which already would make a rectangular or linear beam spot and is narrow after shaping (col. 2, lines 55-60; col. 3, lines 8-47 and Fig. 2, and claims 5 and 8). Figure 1 shows the mask ^{after the converging lens, but discussion on the use of the} refers only to treating the expanded beam without regard to the converging lens and it is further noted that claim 15 has a shaping step before the contracting step, but there are obvious logic errors in the logic of this claim as lines 5 and 8 are identical and the shaping of line 5 can only logically be applied to the expanded laser beam, as the contracting step comes after it. Hence Yamazaki et al (358) implies applicants placement of the mask with respect to the converging lens, but never explicitly states it. Given the teaching on placing the mask in the expanded beam, it would have been obvious to place it before the converging lens, especially for such shaping as is standardly done with a collimator, where the outer edges which may be significantly ^{less in intensity} are removed and the beam is shaped to give a clear spot.

Alternately, the references of Toshiba KK (fig. 3), NEC Corp (131) or (123) or Traskos et al or Hongo et al or Kimmel et al (the US patent has the German patent as a priority document) all show the use of a mask or collimator before a converging lens.

Note that the shape of the lens shown in the figures has a characteristic shape, hence convex or converging need not be stated if the figure is appropriate. Note lens shape in Toshiba KK, NEC Corp. (131-uses pulsed beam a slit to shape the beam before the converging lens as shown in Figs. 1, 2 and 3, described in abstract and p. 9; 123 - Fig. 3 shows slit then converging lens with beam shape and abstract includes semiconductors as substrates), and Hongo et al (Fig. 1 - has beam shape and controlled slit and turns a corner).

The references of Krimmel et al and Traskos et al show more complex patterning. Traskos et al, fig. 1, shows that mask before the converging lens and discusses use of mask as shown or on the other side of the lens (on substrate) in col. 2, lines 56-66. Krimmel et al in Figs. 1 and 3 shows a mask before a convex shaped lens, either before or after directing the beam in an ~~orthogonal~~^{orthogonal} direction. Discussion of Fig. 1 beam path can be found on Col. 4, lines 47-65, and lines 65-68 state that further description of beam path details are not required because they are sufficiently known to those skilled in the art of optical imaging.

From any one of the teachings of masks or slits it would have been obvious to one of ordinary skill in the art, to use Yamazaki et al (358)'s mask before the converging lens because it

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is shown to be a well known and standard technique, especially since it is also implied in (358).

Yamazaki et al (358) also teach a movable table (25) which can be used to cause scanning as claimed with respect to the impingement direction (col. 3, lines 3-7 and claims 6 and 9).

Yamazaki et al (358) does not teach directing the condensed beam in a direction orthogonal (perpendicular) to the original or first beam direction and it discusses patterning a conductive coating, exemplified by the metal oxide, indium tin oxide, instead of semiconductor surfaces. First, since the claimed treating has no particular object~~or~~ effect, what substrate is treated is essentially irrelevant because it is well known and conventional to "treat" conductive, semiconductive or insulating surfaces with laser beams for various effects, such as cleaning, coating or etching. Furthermore, while there is NO patterning required by applicants claims, it is well known to pattern any of the above categories as exemplified by the integrated circuit and Semiconductor device arts.

As for turning the beam perpendicular, as with mirrors (reflectors), this is a conventional procedures which may be motivated by reasons such as chamber, and window substrate geometry. Proper mirror placement can cause orthogonal orientation without changing the beam shape, hence is considered

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an obvious variation of Yamazaki et al (358)'s linear (direct beam path) arrangement.

Alternately, Yamazaki et al (855) is cited for showing both the orthogonal orientation for the converging beam(s) and laser patterning of either a conductive (col. 5, line 7- col. 6, line 9) or semiconductive layer (col. 6, line 33- col. 7, line 10). It would have been obvious to apply these techniques of (855) to (358) because the same conductor layers are taught to be treated for the same purpose (patterning, esp. lines - abstract; col. 3, lines 28-39), the same type of beams are used (excimer - col. 4, line 64-col. 5, line 5) and the same diverging then converging sequence (Fig. 5, col. 5, lines 9-23), making the teaching analogous.

17) Yamazaki et al (518) is considered equivalent to (855) for purposes of the rejection.

Other art: Hideaki Iwano, NEC Corp (973, Misao Saga and Oprysko et al, with more beam paths of interest. Zander et al and Bosch et al with explicit showing and teaching of the beam shape of interest, and Sekine et al, Stafast et al (DR) and the Japanese NEC Corp references (963), (233) and (449) with assorted patterning techniques using various masking arrangements.

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18) Any inquiry concerning this communication should be directed to M. L. Padgett at telephone number (703) 308-2336.

M. Padgett:jmr
September 27, 1994

A handwritten signature in cursive script, appearing to read "Marianne Padgett". The signature is fluid and stylized, with a large initial 'M' and a long, sweeping underline.

MARIANNE PADGETT
PRIMARY EXAMINER
GROUP 1100